

IN THE SPECIFICATION:

Please amend the Specification as follows.

In the Specification, please amend the following text at page 1, lines 1-4, to read as follows:

TITLE OF THE INVENTION

Method for depositing a credit on an account associated to a terminal subscribed to a communication network.

In the Specification, please amend the following text at page 2, line 21 to page 4, line 20, to read as follows:

SUMMARY OF THE INVENTION

Consequently, it is an object of the present invention to provide an improved a method for depositing a credit on an account associated to a terminal subscribed to a communication network.

According to the present invention, the above object is for example achieved by a method for depositing a credit on an account associated to a terminal subscribed to a communication network, the method comprising the steps of: interacting between the terminal and a network-~~entity~~ element, wherein said interacting yields an indication of at least whether a credit is to be deposited on said account associated to said terminal, an amount of credit to be deposited and a source of the deposit, requesting from said network ~~entity~~ element to said source of the deposit, to deposit said amount of credit on an account associated to said terminal, wherein said requesting is based on the DIAMETER protocol.

According to favorable further developments

- said interacting is based on a value-added multimedia application run on a multimedia application server provided in said network,
- said requesting comprises generating a DIAMETER request message identifying the request as a request for depositing an amount to an account,
- said generated DIAMETER request message further includes an attribute value pair identifying the terminal to an associated account of which the deposit is to be deposited, an attribute value pair identifying said source of the deposit, and an attribute value pair identifying the amount of said deposit,
- the DIAMETER request message is routed from said network ~~entity~~element to said source based on said attribute value pair identifying said source of the deposit,
- the method comprises a step of acknowledging, by said source, whether said request was successful or not to said requesting network-~~entity~~element,
- the method further comprises a step of depositing said amount to said account associated to said terminal upon receiving an acknowledgment indicating success,
- the method further comprises a step of informing said terminal of the amount being deposited to an account associated to said terminal.

By virtue of the present invention, basically the following advantages can be achieved:

- with the proposed modifications to the DIAMETER protocol, it can be adopted for on-line charging purposes e.g. in the Internet Protocol (IP) Multimedia Subsystem (IMS) of communication networks,
- making a deposit on a subscriber's account, i.e. an account associated to a terminal used by the subscriber can be effected using the DIAMETER protocol,
- on-line charging and/or depositing of an amount can be effected without involving a third party (vendor at a shop or the like) to become active as the service provider can upload winnings immediately to the account associated to the user's terminal (e.g. a prepaid account), thereby saving administrative work,
- services involving on-line charging / depositing benefit from the simplification of the charging/depositing emerging from the proposed invention,
- new services such as games / quizzes or lotteries can easily be implemented to be carried out interactively by a subscriber using his terminal.

In the Specification, please amend the following text at page 4, line 30 to page 11, line 25, to read as follows:

DETAILED DESCRIPTION OF THE EMBODIMENTS

According to the present invention, in order to enable the deposit of an amount of money, or generally a credit of units (which need not necessarily correspond to money) to an account associated to the terminal through an interface between a network element ~~NE~~ and an ~~Account Server~~ accounting server, a new mechanism is introduced. The new mechanism relies for example on the DIAMETER protocol. It involves in that case a new DIAMETER request including an indication that the request is a deposit/credit to the account and also a new Attribute Value Pair (AVP) indicating the source of the deposit/credit. The answer message indicates to the network element whether the request was successful or not. It has to be noted that Accounting-Request (ACR) as such is not a new request, this is just a new "mechanism" in connection with which also the amount of the deposit must be indicated as well as the identity of the subscriber.

As regards the DIAMETER protocol on which the present invention for example relies, Diameter is an ~~AAA~~ (Authentication, Authorization and Accounting) (AAA) protocol specified in Internet Engineering Task Force (IETF). By virtue of the present invention, DIAMETER is adapted to be used for on-line charging in communication networks, for example in connection with the ~~IP-Multimedia-Subsystem-IMS~~. The All-IP network (~~IP-Internet Protocol~~) will offer many new services. This invention enables DIAMETER to be used for making a deposit on the user's account, thus introducing a quite useful feature for some services. For example, this mechanism supports some services such as games/lotteries performed via the communication network; more precisely, the subscriber could win something i.e. in a game and the service provider / network operator could upload the winnings immediately to a user's account such as a prepaid account. This solution would also provide a benefit to the operators since the money would go directly to the prepaid account and would thus be spent again for communication services.

This will be explained in still greater detail with reference to Fig. 1. Fig. 1 illustrates (horizontally arranged) entities involved in connection with the present invention and signaling there between. In vertical direction, the succession of the signaling with lapse of time is represented. As regards the entities involved, Fig. 1 shows a user equipment UE (e.g. according to Universal Mobile Telecommunications System (UMTS)) as an example for a terminal. The ~~terminal~~-user equipment UE has subscribed to a communication network represented by at least one network element NE. It has to be noted that the network element NE shown in Fig. 1 may combine several functionalities of the network, which for simplification of the drawing and explanation are not shown as individual functional network-entities elements. Furthermore, an accounting server, Accounting Server, is shown which is involved in connection with the present invention.

Associated to the ~~terminal~~-user equipment UE is an account for depositing a credit thereon (not shown). This account can be a pre-paid account maintained for the ~~terminal~~user equipment/subscriber at the network operator (e.g. in connection with subscriber data maintained at the HLR (Home Location Register)/ HSS (Home Subscriber Server). Nevertheless, another account is also possible, e.g. a bank account associated to the ~~terminal~~user equipment/user so that e.g. the subscriber identity (ID) (e.g. telephone number) is mapped to a bank account number. In the latter case, additional routing/rerouting will be involved in order that the deposit is made on the account associated to the ~~terminal~~user equipment.

In a first step (1.), there is an interaction between the ~~terminal~~-user equipment UE and-a ~~network entity~~ the network element NE. The interaction may comprise the bi-directional exchange of data between these and may reside in a game / lottery or the like in which the subscriber participates by means of his ~~terminal~~user equipment. The interacting is for example based on a value-added multimedia application run on a multimedia application server provided in said network. (Note that the network element NE is assumed to comprise this server in the illustration according to Fig. 1).

As a result, in case the user wins in the game or something similar, said interacting yields an indication of at least that a credit is to be deposited an said account associated to said

~~terminal user equipment UE~~, an amount of credit to be deposited and a source of the deposit. The source of the credit to be deposited here means the party who runs the game/lottery, more precisely, the party is represented by an accounting server, Accounting Server, associated to the third party and in charge for the payment of the credits to the winners. The third party is represented by the network ~~entity~~ element NE with which the interaction takes place. For example, in case a plurality of games is offered to be played, the user equipment UE interacts with a selected network ~~entity~~ element NE out of a corresponding plurality of network ~~entities~~ elements. Allocated to the respectively selected network ~~entity~~ element NE there is at least one accounting server in charge of depositing the deposit to the account associated to the user equipment UE. The network element NE decides where the request is to be routed to, i.e. to which accounting server. This decision/selection can be based on e.g. the subscriber information (e.g. in case of plural accounting servers per network ~~entity~~ element) and/or based on the address or identity of the network element NE (e.g. if plural games can be played each involving a respective network ~~entity~~ element operated by a third party). If only one accounting server is provided for, then the routing is easy while however the requesting network ~~entity~~ element NE has to be indicated in the request (using a new AVP for this purpose). To clarify, the source of the deposit viewed from the ~~terminal's user equipment's~~ user's account is the accounting server, Accounting Server, while the accounting server, Accounting Server, always has a knowledge of the origin of the deposit he makes, i.e. of the identity of the third party with which the ~~terminal-user equipment UE~~ has interacted by e.g. playing a game.

Thereafter, in a second step (2.), it is requested from said network ~~entity~~ element NE to said source (here: accounting server, Accounting Server) of the deposit, to deposit said amount of credit on an account associated to said ~~terminal user equipment UE~~. (Note that the amount of credit deposited to the account associated to the ~~terminal-user equipment UE~~ will correspondingly be debited to an account associated to the third party/network element NE, i.e. the origin of the amount to be deposited.) This requesting is based on the DIAMETER protocol. Note that in Fig. 1, the network element NE may take care of the functionalities of a DIAMETER client, DIAMETER server as well as DIAMETER proxy agent, if required according to the circumstances.

It is to be noted that DIAMETER has been chosen as an example only for this embodiment of the present invention. Other AAA protocols such as ~~RADIUS~~ (Remote Authentication Dial In User Service) (RADIUS) or any other suitable AAA protocol could be accordingly adapted as proposed by the present invention. A brief introduction to DIAMETER can for example be found in „Authentication, Authorization and Accounting in Session Initiation Protocol Networks“ by Aki Niemi, Master’s Thesis at the Helsinki University of Technology (HUT), March 7, 2002 (retrieved from the Internet on June 3, 2002), pages 26 to 36.

This request is based on a generated DIAMETER request message (ACR(Event_Record)) identifying the request as a request for depositing an amount to an account. To this end, a new request identity in the DIAMETER protocol is defined. Stated in other words, more precisely, in case of DIAMETER protocol, the command code identifies the command and here an existing Diameter request (ACR, Accounting Request) is used. Also an existing AVP (Accounting-Record-Type) is used (its value is event_record in this case). In addition to this, some indication (a new ~~Attribute Value Pair~~ AVP, i.e. some specific AVP used only for this service) is needed that will indicate that the purpose of the request is to deposit an amount of e.g. money to an account.

The thus identified generated DIAMETER request message further includes a (newly defined) ~~attribute value pair~~ AVP identifying the ~~terminal-user equipment~~ (here the user equipment UE) to an associated account of which the deposit is to be deposited, an attribute value pair identifying said source of the deposit (i.e. the ~~account-accounting~~ server, Accounting Server), and an attribute value pair identifying the amount of said deposit. Note that in case plural accounts are associated to one ~~terminal-user equipment~~, the ~~terminal-user equipment~~ identification additionally includes an indication of the account concerned. For example, in case of a ~~terminal-user equipment~~ being used by several users, each entering a personal identification code when taking the ~~terminal-user equipment~~ in use, the account concerned can be distinguished based on the user’s ID. Thus, not only the ~~terminal-user equipment~~ as such but also the account concerned is then included in the AVP in case plural accounts are associated to the ~~terminal-user equipment~~.

This DIAMETER request message is routed from said network entity element NE to said ~~source-accounting server~~, Accounting Server, based on said attribute value pair identifying said source of the deposit. In Fig. 1, only one accounting server, Accounting Server, is shown for simplicity of the drawing. Nevertheless, in case more than one accounting server is available in the entire network, the request is routed to the „correct“ one identified by the AVP. The entry into the AVP thus represents an address for routing.

Upon receipt of the request in step 2, the ~~source-accounting server~~, Accounting Server, acknowledges in step 3., whether said request was successful or not to said requesting network-entity element NE. This acknowledgment is returned in an Accounting-Answer (ACA) Event_Record message according to the DIAMETER protocol. Also for this message, a suitable result code covering possible results to be informed to the requesting network element is newly defined. In case of a positive acknowledgment, i.e. upon receiving an acknowledgment indicating success, a step of depositing said amount to said account associated to said ~~terminal-user equipment UE~~ is performed. This step is not shown separately but is performed at the network element NE upon evaluation of the acknowledgment. That is, the network element NE has already knowledge of the ~~terminal-user equipment UE~~/account concerned and of the amount to be deposited and performs the depositing upon a confirmation to do so (positive acknowledgment).

Finally, according to the proposed method, informing said ~~terminal-user equipment UE~~ of the amount being deposited to an account associated to said ~~terminal-user equipment UE~~ is performed in step 4. This informing needs not to rely on any specific protocol requirements. For example, it can be effected using a similar multi-media application as in step 1. The user of the ~~terminal-user equipment UE~~ has then knowledge of his updated account balance upon the amount being deposited.

Thus, one advantageous application of the present invention resides in e.g. IP Multimedia services, where Diameter is adopted for online charging. In this way, a multimedia application server (e.g. game server) could use the same Diameter charging connection to the account for depositing winnings and no separate connections are needed.

Accordingly, has been described above, the present invention concerns a method for depositing a credit on an account associated to a terminal subscribed to a communication network, the method comprising the steps of: interacting 1 between the terminal and a network-entity element, wherein said interacting yields an indication of at least whether a credit is to be deposited on said account associated to said terminal, an amount of credit to be deposited and a source of the deposit, requesting 2 from said network entity-element to said source of the deposit, to deposit said amount of credit on an account associated to said terminal, wherein said requesting is based on the DIAMETER protocol.

While the invention has been described with reference to a preferred embodiment, the description is illustrative of the invention and is not to be construed as limiting the invention. Various modifications and applications may occur to those skilled in the art without departing from the true spirit and scope of the invention as defined by the appended claims.